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Sound insulation device

A foam web which is known per se and with a studded profile on one side is arranged such that that side which is provided with studs faces away from the sound incidence and rests on a wall or a support. This makes it possible to achieve a major improvement in the sound insulation effect in comparison to the known arrangement, in which the studded profile faces the sound incidence.

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SOUND INSULATION DEVICE

Patent Claims

1. Sound insulation device in the form of a foam web which is provided with a studded profile on one side, characterized
in that the foam web is arranged with the side that is provided with the studs facing away from the sound incidence.

2. Sound insulation device according to Claim 1, characterized
in that the studded profile (3) is coated with a film (5).

3. Sound insulation device according to Claims 1 and 2, characterized

in that that side of the foam web which is opposite the studded profile (3) is designed to be smooth and is spray-coated.

4. Sound insulation device according to Claims 1 to 3, characterized
in that the ratio of the stud height to the remaining thickness of the foam web is 1:1 to 1:3.

5. Sound insulation device according to the preceding claims,
characterized
in that at least two foam webs which are provided with a studded profile (3) are arranged one on top of the other.

6. Sound insulation device according to Claim 5,
characterized
in that a supporting panel (6) is arranged between the foam webs (1).

SOUND INSULATION DEVICE

The invention relates to a sound insulation device according to the precharacterizing clause of Claim 1.

It is known for sound absorption to be achieved by using foam webs which are provided with a studded profile on the side which faces the sound incidence and with a smooth surface on the opposite contact side. In this case, the studs are intended to increase the sound absorption of the foam material by breaking the incident sound waves.

The invention is based on the object of designing a sound insulation device of the type mentioned initially such that the sound insulation effect is considerably improved by very simple means.

This object is achieved by the features in the characterizing part of Claim 1. Surprisingly, it has been shown that a considerable improvement in the sound insulation effect can be achieved solely by arranging the foam web the opposite way round to that which was previously normal, such that the smooth side faces the sound incidence and the studded profile faces away from the sound incidence. This is due to the fact that the studded profile forms cavities on the side of the foam web facing away from the sound incidence, in which the sound energy which enters the foam material is destroyed. Experiments have shown that this makes it possible to achieve an improvement in the sound insulation effect of up to 50% in comparison to the known arrangement.

Advantageous refinements of the invention are specified in the following description and in the further claims.

One exemplary embodiment of the invention will be explained in more detail in the following text with reference to the drawing in which:

Figure 1 shows a section illustration of the arrangement of a foam web with a studded profile,

Figure 2 shows a modified embodiment of the foam web,

Figure 3 shows an arrangement of two foam webs, and

Figure 4 shows a further arrangement of two or more foam webs.

In the figures, 1 denotes a foam web which, for example, is composed of polyurethane foam. The foam web is provided with a smooth surface 2 on one side, and with a studded profile 3 on the opposite side. The profile depth t may be about one third of the overall thickness d of the foam web. The ratio between the profile depth and the remaining thickness of the foam web is preferably 1:1, such that, for example, the stud height is 15 mm for an overall thickness of the foam web of 30 mm. However, a ratio of 1:2 to 1:3 is also possible. The studs are in the form of individual truncated-conical projections with a rounded top, as is known per se. Other stud shapes may also be provided.

The smooth side 2 of the foam web may be spray-coated, as is described in DE PS 31 12 883. The pores on this smooth side 2 may also be exposed. Furthermore, it is also possible to use an open-celled or close-celled foam.

In the arrangement shown in Figure 1, the foam web 1 is arranged resting on a wall 4 or the like, with the sound incidence being indicated by a double-headed arrow. The cavities which are created between the foam web 1 and the wall 4 by the studded profile 3 achieve a considerable improvement in the sound insulation effect in comparison to the arrangement which is known per se, in which the smooth surface 2 rests on the wall 4 and the studded

profile faces the sound incidence. An improvement in the sound absorption of up to twice that of the known arrangement can be achieved, depending on the choice of the thickness of the foam web.

It is also possible to provide a profile on the smooth side 2, but this does not significantly improve the sound absorption effect.

Figure 2 shows a foam web in which a film 5 is adhesively bonded onto the tops of the individual studs on the side of the studded profile 3, thus resulting in a smooth outer surface on the side with the studded profile 3, as well. This foam web can be arranged in the same way as that shown in Figures 1, 3 and 4.

In the arrangement shown in Figure 3, two foam webs 1 are located with the side with the studded profile 3 opposite one another, thus resulting in a structure which is smooth on the two outer surfaces, but in whose interior the studded profiles 3 which are in contact with one another form cavities. An arrangement such as this can be provided when sound is incident from both sides and the respective opposite side is intended to be screened. In an arrangement such as this, a supporting panel 6 can be provided for stiffening, and is arranged between the two foam webs. This supporting panel 6 may have a closed design or a design through which sound can pass.

In the arrangement shown in Figure 4, two foam webs 1 rest on one another such that the studded side 3 rests on the smooth side of the following foam web. A plurality of foam webs can be arranged one on top of the other in this way, as well. In this arrangement as well, a supporting panel can be arranged between the foam webs 1, preferably on the side with the exposed studs.

The film 5 as shown in Figure 2 is preferably in the form of a self-adhesive film which can be used as assembly aid. The film can also be perforated in order to adjust the air flow resistance, thus allowing even low-cost lightweight foams to be used as the material. The film forms membranes over the cavities which are located between the studs, which can oscillate if arranged appropriately. This film may also have a certain thickness in order to provide the oscillation capability.

In an arrangement as shown in Figure 3 or 4, foam webs can also be used with a different stud configuration or with a different ratio of the stud height and foam thickness.

It is also possible to provide a reinforcing insert within the foam web, running through the entire area of the foam.

The film 5 may also rest on the studs only in places, for example on every fifth or tenth stud.

The foam webs may be provided with impregnation, as a result of which they are self-supporting.

In the arrangement of a support 6 between the profiled foam webs, the support can itself be designed such that it represents a certain mass. It may also be in the form of a perforated surface.

The wall 4 in Figure 1 may also be in the form of a supporting panel or the like.

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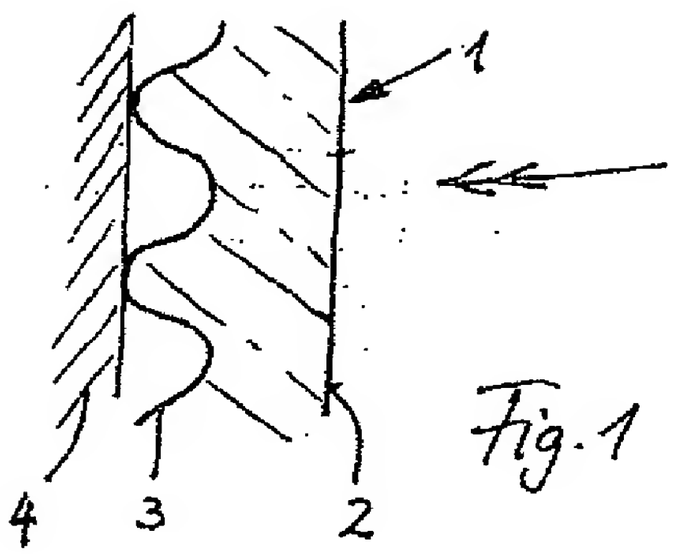

Fig. 1

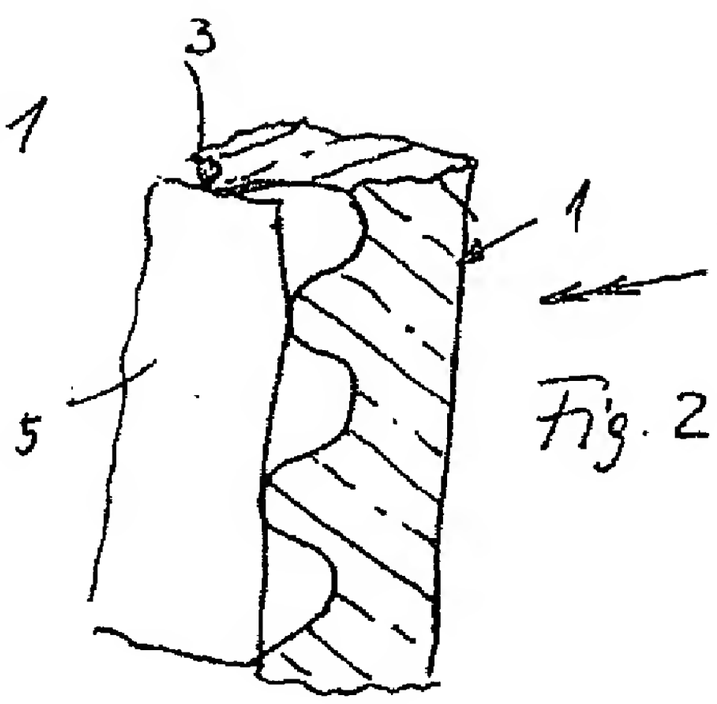

Fig. 2

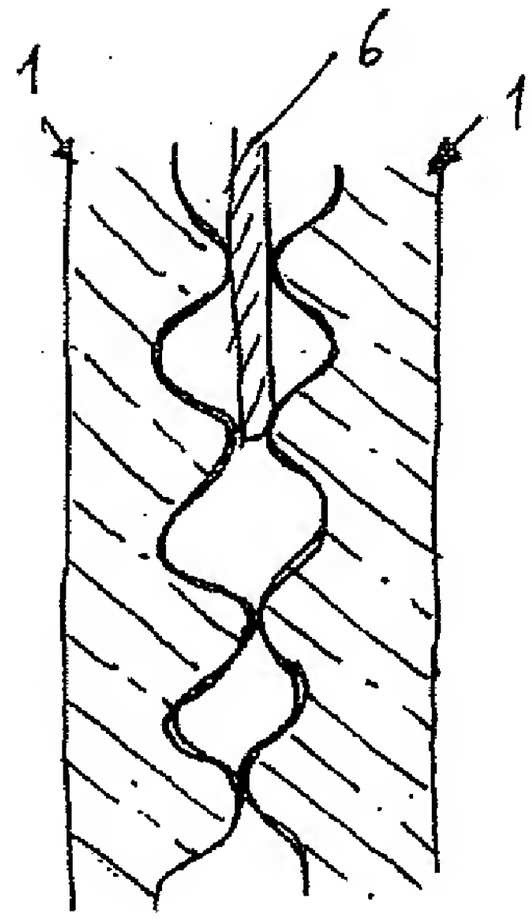

Fig. 3

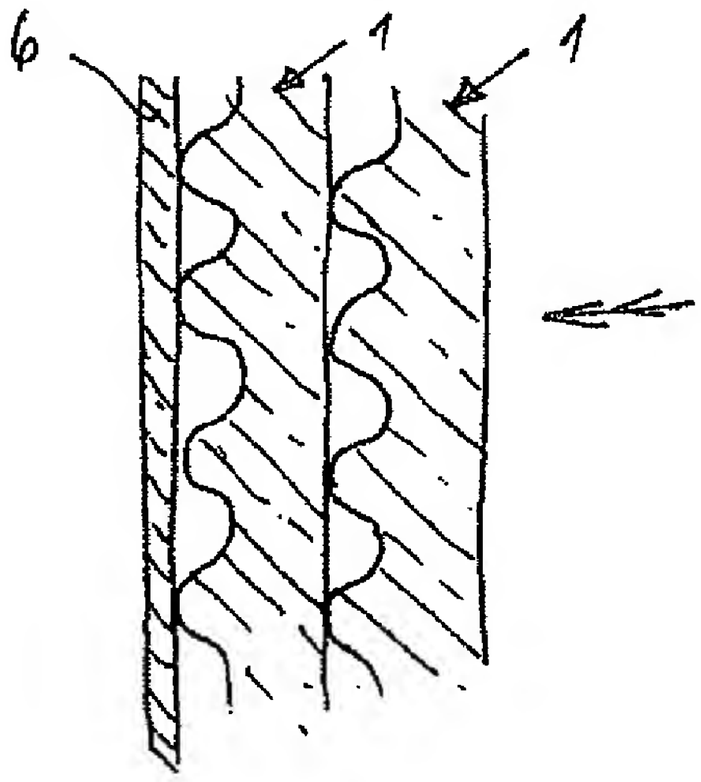

Fig. 4